

What is claimed is:

1. A semiconductor device comprising:

a semiconductor element;

5 a lead frame having a first surface for mounting said semiconductor element thereon, and a second surface opposite from said first surface;

a metal block provided on said second surface of said lead frame;

an insulation layer provided on said metal block opposite said lead frame; and

10 a bonding material between said second surface of said lead frame and said metal block, said bonding material being better in heat conduction than said insulation layer.

2. The semiconductor device according to claim 1,

15 wherein said metal block is disposed in opposed relation to said semiconductor element.

3. The semiconductor device according to claim 1,

wherein said metal block has a wider surface than said bonding material opposite said bonding material.

20 4. The semiconductor device according to claim 1,

wherein said semiconductor element includes a plurality of semiconductor elements, and

25 wherein said metal block is separate for each insulated unit between said semiconductor elements, and is provided in corresponding relation to at least one of said

semiconductor elements.

5. The semiconductor device according to claim 1, further comprising

a resin package for sealing said semiconductor element, said lead frame and

5 said metal block while uncovering said insulation layer,

wherein said insulation layer is better in heat conduction than said resin package.

6. The semiconductor device according to claim 5,

10 wherein said insulation layer comprises a base material with the same base as said resin package, and ceramic powder.

7. The semiconductor device according to claim 1,

15 wherein said metal block has a first surface and a second surface opposite said insulation layer,

wherein said first surface of said metal block is closer, as viewed in the vertical direction, to said lead frame than is said second surface of said metal block, and

wherein said bonding material lies between said second surface of said lead frame and said first surface of said metal block.

8. The semiconductor device according to claim 1,

wherein said lead frame has a third surface, and

wherein said third surface is closer, as viewed in the vertical direction, to said semiconductor element than is said second surface to define an insulation space between

25 said metal block and said third surface.

9. A method of manufacturing a semiconductor device, comprising the steps of:

(a) preparing a semiconductor element;

(b) preparing a first resin in a semi-cured state;

5 (c) covering said semiconductor element and said first resin with a second resin,
said step (c) being performed after said steps (a) and (b); and

(d) simultaneously curing said first resin and said second resin, said step (d)
being performed after said step (c).

10 10. The method according to claim 9, further comprising the steps of:

(e) preparing a lead frame having a first surface and a second surface opposite
from said first surface, and a metal block, said step (e) being performed before said step
(c);

(f) mounting said semiconductor element on said first surface of said lead frame,

15 said step (f) being performed before said step (c) and after said steps (a), (b) and (e);

(g) providing said metal block on said second surface of said lead frame, with a
bonding material therebetween, said step (g) being performed before said step (c) and
after said steps (a), (b) and (e); and

(h) providing said first resin on said metal block opposite said lead frame, said
20 step (h) being performed before said step (c) and after said steps (a), (b) and (e),

wherein said bonding material is better in heat conduction than said first resin,
and

wherein said second resin in said step (c) also covers said lead frame and said
metal block while uncovering said first resin.

11. The method according to claim 10,

wherein said first resin comprises a base material with the same base as said second resin, and ceramic powder.